RESEARCH PLAN PROPOSAL

Design and Implementation of Flower Species Recognition System based on Optimised Machine Learning Algorithm

For registration to the degree of
Doctor of Philosophy

IN THE FACULTY OF SCIENCE

THE IIS UNIVERSITY, JAIPUR

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August 2019

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1. Topic

"Design and implementation of flower species recognition system based on optimised machine learning algorithm"

2. Introduction

India is an Agricultural Country. India ranks second worldwide in farming after China stated according to European Union food production 2018 [Blake.*et.al*.(2018)] [Sean Clark.*et.al*.(2018)]. Around 60.3% land as agricultural land, according to World Bank, with 50% population engaged in agricultural activities while over 70 per cent of the rural households depend on agriculture as their principal means of livelihood. In which floriculture industry, It is growing at an annual rate of 25 percent per annum. As per National Horticulture Database published by National Horticulture Board, during 2017-18 [Mamta Saxena.*et.al.*(2018)] the area under floriculture production in India is increasing day by day. Floriculture is now commercially cultivated in several states with Tamil Nadu (20%), Karnataka (13.5%) West Bengal (12.2%), having gone ahead of other producing states like Madhya Pradesh, Mizoram, Gujarat, Punjab, Andhra Pradesh, Orissa, Jharkhand, Haryana, Assam and Chhattisgarh. The Cultivation of Flower based on Two Type : the Cut flowers and the Loose flowers. Cut Flowers are flowers or flower buds (often with some stem and leaf) that have been cut from the plant stalk it. It is usually removed from the plant for decorative use. Loose Flowers are the flowers which are usually harvested without stalk. These are used in worship, medicines, fragrance industry, oil extraction etc.

Flower wise Production of Horticulture Crops

For Three Years [Dr. S.K Pattanayak*et.al* (2018).]

Area in Hectors

Production in Metric ton

Flower	2014-15		2015-16		2016-17	
	Area	Production	Area	Production	Area	Production
Orchids	106	535	108	551	121	662
Rose	760	2647	748	3192	908	3143
Carnation	70	312	62	287	55	298
Marigold	748	3192	912	3206	912	3451
Lily	183	1021	191	1037	167	987
Glardiya	54	221	47	109	51	278
Jasmine	908	3143	818	3221	912	3233
Other Flower	2406	1803	1677	1734	2768	2118
Total Floriculture	5235	12874	4563	13337	5894	14170

The Rose, Marigold, Jasmine and Lily are the flower which cultivation is more as compare to Orchids, Carnationand Gladiyafrom all state of India. Thus, for better recognition for this most cultivated flower, machine learning is known to latest technique for flower recognition. Supervised classification is one of the tasks which are most frequently carried out in Intelligent Systems. The goal of supervised learning is to build a concise model of the distribution of class labels in term of predict features. This predicts the features that can be learned by the labeled data. After understanding the data, the algorithm determines which label should be given to new data based on pattern and associating the patterns to the unlabeled new data. This will help to predict the outcome for unforeseen data successfully building, scaling, and deploying accurate supervised machine learning model that gives the true data

until its object changes. Labeling the pictures of the dataset before training is necessary, because learning process of classification is supervised learning. The Supervised learning allows you to collect data or produce a data output from the previous experience which helps to optimize performance criteria using experience dataset.

By Dr. S.K.Pattanayak.*et.al* (2018), this has been observed that Rose, Marigold, Jasmine and Lily are the flower which cultivation is more as compare to Orchids, Carnation, Glardiyafrom all state of India. By considering this priority of flower, various researches has been constructed using image processing techniques [V. Sai Sundar.*et.al*, 2015], colour features and the K-nearest neighbor algorithm [Tiay.*et.al*, 2014], Segmentation of Index Domain [Madirakshi Das.*et.al*, 2011], Matrix propagation over texture [Ashraf Ahmad. *et.al*, 2013]. HONG An-xiang.*et.al. (*2004) retrieved the region of interest for flower region from border. It is observed that traditional techniques may not perform well with fewer observations and are limited by insufficient technique used by them through older methodology and implementations. Also, these traditional methods do not provide effective outputs for different flower detection with their recognition when they all are grouped by a single system.

By changing technology and improving methodology, there is a need for a better path for the flower recognition so as to achieve the data set that can be widely available in India which can be continuously obtained by capturing the image by using different techniques and easily be handle and useful.

Artificial intelligence and machine learning are the most important technologies which are used now a day for better detection and recognition to achieve the output in better way.

3. Review of Literature

3.1 Methodology of Literature Review:

A literature review includes the current knowledge including substantive findings, as well as theoretical and methodological contributions to a particular topic. It gives an overview of key findings, concepts and developments in relation to a research problem or question. Literature reviews are designed to provide an overview of sources you have explored while researching a particular topic and to demonstrate to your readers how your research fits within a larger field of study.Most often associated with academic-oriented literature, such reviews are found in academic journals, and are not to be confused with book reviews that may also appear in the same publication. Literature reviews are a basis for research in nearly every academic field.

The study has used **Systematic Literature Review** methodology and presented below.

1. **Literature collection and boundary identification:**
   - Database used, Google scholar for searching articles;
   - Paper published only in peer-reviewed academic journals are considered;
   - Paper are collected for last 17 years ; and

2. **Description and recognition of Literature:**
   - Analyze, interpret and critically evaluate the literature
   - Analysis by year of publication
   - Analysis by Journal of Publications
   - Analysis by Status :
     National
     International

3.2 Reviewed Articles

3.2.1Research Articles by year of publication:

Year	No. of Research Paper
1994-2000	2
2001-2005	9
2006-2010	9
2011-2015	12
2016-2018	16
2019	4

3.2.2 Research article by Journal of Publication:

S.No.	Journal of Publication
1	IEEE 3rd International Conference on Signal and Image Processing
2	International Journal Of Scientific & Technology Research
3	SIAM Journal on Imaging Sciences
4	IEEE International Conference on Pattern Recognition
5	International Conference on Computational Intelligence and Data Science
6	Springer Journal
7	IEEE Transactions on Pattern Analysis and machine Intelligence
8	International Journal of Computer Science
9	ISPRS Journal of Photogrammetry and Remote Sensing
10	Oceans-St. John's
11	IEEE Computer Vision and Pattern Recognition
12	Plant Methods Journal
13	Springer Nature Singapore
14	Journal of Image Processing & Pattern Recognition Progress (JoIPPRP)
15	Elsevier: The Korean Institute of Communications Information Sciences, Science Direct
16	44th International Conference on Software Engineering and Advanced Applications
17	International Journal of Imaging Systems and Technology
18	International Journal of Computer Vision
19	IET Image Processing journal
20	IEEE Transactions on Image Processing
21	IEEE Intelligent system
22	Computer Science
23	IEEE Access

3.2.3 Research article by Status:

National	International
01	51

3.3 Review of Literature

Author Name Year/Journal	Summary/ Objective	Methodology Implemented	Resultant / Observation/	Drawback and Future Scope
Prashengit Dhar. 2019/ I.J. Image, Graphics and Signal Processing ,	1. A segmentation technique is used for the recognition of flower that can separate the flower from background easy. 2. The research is carried out using a method to classify flower with the help of LBP and SURF as features and SVM as a classifier. 3. Image is clicked by digital camera then segmentation of image is applied by active contour segmentation method. After segmentation of the image, LBP and SURF features are extracted. 4. Support Vector Machine (SVM) trains these feature and tests to classify which is significant and comparable for this recognition task.	1. Input mage is processed first to remove noise and improve image quality by using median filter. Noisy image can affects a system. 2. Image is segmented by active contour segmentation method. This active contour segmentation method is iterative process. Though it is an iterative process, but the time taken by it is negligible. 3. The Local Binary Patterns (LBP) that observable case of Spectrum model of texture and Speeded Up Robust Feature (SURF) used for equal size of sub-regions formation by dividing neighboring regions are separately extracted. After that recognition is performed.	1. The 87.2% accuracy gained by the system 2. Four flower species are measured named as Daffodil, Iris, Daisy, and Sunflower. 3. SURF (Speeded Up Robust Feature) is an extended version of SIFT algorithm. SURF is computationally faster than SIFT	1. Direction of the image capturing with percent of resolution is not describe. 2. Number of flower measured in this species is not clear. 3. Comparison between SIFT algorithm and SURF algorithm not described or mentioned. 4. More dataset make this clearer to demonstrate the efficiency of the system.

Musa Cıbuk, Umit Budak, Yanhui Guo, M. Cevdet Ince, Abdulkadir Sengur. 2019/ Elsevier; Measurement: Journal of the International Measurement Confederation,	1. The research carried out on the Image-based automatic flower species classification is done using deep convolutional neural networks (DCNN) classification based on hybrid method which is applied to flower species. 2. It support the Support vector machine (SVM) for the Radial Bases Function (RBF) classification over the kernel. 3. The dataset used for the flower are from University of Oxford named as Flower17 and Flower102 which have a huge amount of category are used in the experimental works.	1. A pre-trained DCNN model for feature extraction is used, which use the two popular DCNN architectures namely AlexNet and VGG16. 2. A feature selection algorithm along with the minimum Redundancy Maximum Relevance (mRMR) method is used to select the more efficient features classification of flower. 3. It worked on the 6^{th} Layer & 7^{th} Layer of DCN with 3 connected Layers.	1. The Flower classification over the Matalb software using DCCN technology carried out the 90.39% and 85.70% accuracy for FLOWER17 and FLOWER 102 Species. 2. Flower17 contain 80 images and Flower102 have 8189 images of flower with different colours and direction captured total of 8269 image tested. 3. AlexNet feature model produced better results than VGG16 model for all experiments. 4. Flower17 species classification provides result better than Flower102 Species.	1. Better resultant can be achieved with high dataset. 2. All flower species not recognize and classified which are cultivated in India like Tulip, Lily, Lavender, Jasmine, all species of Rose and marigold. 3. No detail is provided about capturing of image with their distance, location, light effect, colour range.
Prabira Kumar Sethy, Bijayalaxmi Routray and Santi	1. The paper is carried out for the counting of the marigold flower on the cultivated land as Marigold and the rose flower is the most cultivation flower in India. 2. The colour	1. The methodology applied over this research is detecting and counting marigold flower through HSV colour transformation and circular Hough transform (CHT). 2. The Image capturing of marigold flower from	1. The developed algorithm successfully detects and counts the marigold flower of an open field with an error of 5%. 2. On an average, manual count is	1. Detection of only two types of species of marigold. 2. Number of flower tested is not mentioned in the paper. 3. Direction of flower image and

Kumari Behera. 2019/Springer Nature Singapore Pte Ltd., Advances in Computer, Communication and Control	segmentation-based technique used for marigold flower image. 3. The circle fitting algorithms is applied over the flower for counting the circular shape to get better shape resultant.	digital camera with less than one meter of distance. 3. The HSV colour space is used for flower colour extraction from the colour segment and then HSV transformed image is measured for image scaling and then converted into its Binary image. 4. The Circular Hough transform (CHT) is a feature extraction technique to detect circles over the matrices. 5. The circle fitting algorithms are applied for counting the marigold flower image.	more than the system count.	size of picture accepted by system is not described. 4. Detection is not made efficient result according to the algorithm applied.
Lin Shi, Zhigang Li and Dingli Song. 2019/ IOP Conference Series: Earth and Environmental Science IOP Publishing Ltd	1. The research is achieved for the construction of flower auto recognition system with high accuracy through deep learning. 2. The mobile smartphone are used to capture the images and then send to the CNN network. 3. In which the image is measured through the trained set of images by transfer learning based on the Inception-V3 4. The flower recognition system developed on the	1. The system methodology is gained through CNN Network based on Inception-V3 on a smaller dataset to get a higher accuracy. 2. The image is collected from the dataset of 32 species converted into the Tfrecord format which is a standard format of TensorFlow that officially recommended. 3. This TensorFlow model of CNN use the Inception V3 for trained the image through supervised learning through the bottleneck layers for 32 categories of flower image to be tested and marked into label.	1. The tested images of 32 categories of flower with an error of 11 % to17%. 2. The dataset is collected of 1920 images in which 640 images are tested. 3. The observation as the implementation of Inception-v3 model in CNN reduces the hardware requirement of the system. 4. The flower from Oxford Flower set is gathered through FLOWER17 and	1. Type of flower tested like colour, shape, size is not describe in the paper 2. Which flower category is built in the dataset and which is left over is not clear. 3. More flower Dataset can be increased to test better result. 4. The future work should focus on building an automatic recognition system, which can not only identify flowers, but also

	bases on labelling, training process, verification process and testing process.		FLOWER10 and formed a 32 species of flowers. .	accurately identify the stem and leaf of plants and flower bud.
Huthaifa Almogdady, Dr. Saher Manaseer, Dr.Hazem Hiary. 2018/ International Journal Of Scientific & Technology Research	1. In paper carried out a flower recognition system for the Oxford 102 flowers dataset using image processing techniques, combined with Artificial neural networks (ANN). 2. The dataset consists of 8189 flowers images that belong to 102 flower species, each species contains 40 to 251 images that has been gathered using internet searching or directly from photographers. 3. This use the chan-vese active contour for the features extraction for all colour, texture and shape with HSV colour descriptor, Gray Level Co-occurrence Matrix (GLCM) as texture descriptor, and Invariant Moments (IM) as a shape	This research methodology is proposed approach is divided into four stages as following: 1. Image Enhancements will include for the imageprocessing technique that help in making flowerimages more data extractable, clearer and more useful that are used image cropping and extracting the Blue layer of Our flowers (RGB) coloured image. 2. For the Image Segmentation the Chan-vese image processing segmentation technique I used for segmented flowers object (foreground) from the rest of background image in order to simplify and enhance features extraction process. **3.** The Features Extraction process used for Extracting flowers features such as texture using Gray Level Co-occurrence Matrices (GLCM), colour using	1. The output of classification measured as 70.89%, in which acceptable ratio is 21.04 and not desired ratio is 8.07. 2. MATLAB Neural Network tools are used for flower classification. 3. The University of Oxford Flower 102 is used as dataset. .	1. The detailed study of ANN better in feature extraction is not described. . 2. Better result can gained using CNN along with deep neural network along with image processing. 3. Colour, feature and species extraction is not clear in the paper. 4. Enhancing the output of segmentation process by modifying parameters of active contour model or by using another segmentation approach, 5. There are many colour, texture and shape descriptor may be used as replacements of their approach or

	descriptor. 4. For the classification, Artificial Neural Network (ANN) is used for better result.	(HSV) Moments and shape using Hu Moments. 4. Lastly the Classification process is carried out for the flowers images based extraction features through the Back Propagation Artificial Neural Network		same descriptor in deferent approaches of methodology. 6. The number of neurons inside ANN layers considers as optimization problem and a lot of work could be done only by working on the ANN parameters and features.
Jyothi V K, D S Guru , Sharath Kumar Y H. 2018/ ELSEVIER, International Conference on Computational Intelligence and Data Science (ICCIDS	1. A flower video retrieval system is constructed through Deep learning approach for training and learning features. Network is trained in three ways; with key frames, with segmented flowers and with gradient of the flowers as input. 2. The system retrieves similar videos from the database using Multiclass Support Vector Machine (MSVM). 3. The complexity of the system is reduced by training the DCNN network using gradient of the flowers	1. This model methodology involves into four stages namely preprocessing, deep feature extraction and generation of support vectors and finally retrieval of flower videos 2. The research to retrieve videos with three different ways as: Key frame selection, where a video is a sequence of discrete then Segmentation is the process for extracting objects from its background and then the gradient of flowers	1. The accuracy of resultant frame set of flower is changed according to the trained set. 1. The 30 trained set have calculated and gain the accuracy of 72.61% but as the trained set increased to 80 its accuracy changed to 75.14%. 2. The flower video data set is consisting of more than 2600 flower videos belonging to 30 different classes of flowers.	1. From the resultant, it is clear that if the frame continuity is for less time, detection rate is less(in percentage) 2. And it the continuity rate is for some longer rate then the accuracy rate increase with better rate (in percentage). 3. So, It is better to have a continuous frame rate of flower to achieve better accuracy.

2018)				
Hazem Hiary, Heba Saadeh, Maha Saadeh, Mohammad Yaqub. 2018/ The Institution of Engineering and Technology: Computer Vision	1. In this research paper, it describe that the classification of flower is a challenging task due to the wide range of flower species, which have a similar shape, appearance or surrounding objects such as leaves and grass. 2. For better classification, the author has propose the technique of classification of flower through deep learning classifier for a wide range of species into two-step: a. First, they proposed flower segmentation approach is modelled in which the flower region is segmented through a localization of the minimum bounding box around it by the binary classifier with a fully convolutional	1. The Methodology used for flower classification through localizes segmentation which automatically allows the detection of the flower within the image by segmenting the flower region using Fully Convolution Network (FCN) method over the flower region. 2. The segmentation task as a binary classification problem; i.e. 0 for background and 1 for the flower region(s). 3. After the segmented region, the task is simplified since the highly discriminative regions are mainly kept while other possible misleading regions are removed through CNN trained class through 5 layers and 3 fully connected layer parameters.	1. The combination of Fully Connected Network and Convolution Neural Network with segmentation carried an accuracy of 72.10% for the dataset of FLOWER17 of Oxford University. 2. If only Convolution Neural Network is used without segmentation then the accuracy is achieved of 70.4%. for the dataset of FLOWER17 of Oxford University. 3. And if the FLOWER102 dataset is tested, then the combination of Fully Connected Network and Convolution Neural Network with segmentation carried an accuracy of 71.10%. 4. And if only Convolution Neural Network is used without	1. Segmentation and detection of the minimal flower region allow for a more accurate classification because it allows the classification CNN to focus on the region of interest while excluding non-discriminative regions. 2. The 168 flower out of 10,000 images were misclassified from all datasets which is better in the concern of detection but which flower are misclassify are not detailed in the paper. 3. It need to be checked as this methodology is how much successful when image is captured by user itself instead of given dataset of University of Oxford.

	network framework. b. Second, they build a convolutional neural network classifier to distinguish the different flower types over the training stage to ensure robust, accurate and real-time classification.		segmentation then the accuracy is decreased to 66.6%. for the dataset of FLOWER102.	
Ping Lin, Yongming Chen. 2018 / 3rd IEEE International Conference on Image, Vision and Computing	1. This paper used the automated strawberry flower yield estimation and harvesting. A state-of-the-art deep-level object detection framework of region-based convolutional neural network (R-CNN) was developed for improving the accuracy of detecting strawberry flowers in outdoor field. 2. The author used a supervised learning over 400 strawberry flower images and tested on 100 strawberry flower images. 3. To capture features on multiple scales,	1. For System methodology, strawberry flower data were captured by camera. 2. Region-based Convolution Neural Networks (R-CNN) is used for object detection. It use supervised pre-training set for feature extractor using Support Vector Machines (SVM). 3. Fast R-CNN [Ren, S., He, K., Girshick, R., & Sun, J, 2017] use the feature map once per image in a fully convolutional style with ROI pooling to dynamically sample features object. 4. Faster R-CNN implemented in a fully convolutional style to predict the object bounding boxes and the	1. The main aim of the system is to detect strawberry flowers under poor conditions. Such as changes in illumination, size, location, even if strawberry flowers are occluded by foliage, or overlapped among flowers which easy detect on the Success rate by Faster R-CNN compare to Fast R-CNN and R-CNN. 2. The detection rate for R-CNN, Fast R-CNN and Faster R-CNN models were 63.4%, 76.7%	1. R-CNN is very time-consuming that takes a long time to generate region. the features store in a hard disk which also takes up a large amount of space. Thus R-CNN is slow because it processes each object proposal independently without sharing computation. 2. Fast R-CNN the region proposal step is still remains a bottleneck since it is designed out of the network. 3. The Dataset of number of images are not shown in the

	three different region based object detection methods including R-CNN, Fast R-CNN and Faster R-CNN were presented to represent the strawberry flower instances. 4. Automatic yield estimation provides a better solution for counting for yield estimation of fruits or flowers.	classification by region proposal generation and detection computation within a very short time	and 76.1%, respectively in which Faster R-CNN shows the best output. 3. The Four cameras which traversed across different rows of the fields to collect strawberry flower having high resolution to obtain good flower images	paper. 4. The lacking accuracy under which condition is not describe, thus better algorithm can be implemented to achieve better resultant.
Xiaoling Xia, Cui Xu. 2017 / IEEE 2nd International Conference on Image, Vision and Computing	This paper uses the technique of Inception V3 through CNN which is the initial change to the flower extraction and recognition. This paper was the first to describe the flower classification through Inception Version 3. Various people click image for fun and find them over internet but the complex background of flowers make it difficult to recognition of flower images among the similarity between the different species of flowers and the differences among the same species of	This methodology uses the transfer learning technique to retrain the Inception-v model of TensorFlow on the flower dataset. This flower dataset used the two datasets for flower classification model training i.e. the Oxford-I7 flower dataset and Oxford-102 dataset. Inception-v3 is one of the pertained models on the TensorFlow. It is a rethinking for the initial structure of computer vision. The Inception-v3 model is trained on the ImageNet datasets, containing the information that can identify 1000 classes in ImageNet.	1. The standard flower set of Oxford- 17 flower retrieve the accuracy 81% and Oxford-102 accuracy of validation set 77% for flower dataset. 2. The Oxford-102 dataset show lower accuracy rate compare to Oxford- 17 due to different flower species and more collective images of flower. 3. The flower recognition rate is compare with the older forms of image classification as pattern classification of flower, computer	1. Collectively, it brings the new methods of flower recognition than the tradition one. 2. This technique shows better result as compare to older forms. 3. Accuracy rate in flower images is not shown by the author. 4. Better percentage of classification occurs at which flower species is not describe.

	flowers. This paper uses the transfer learning technology to retrain the flower category datasets, which can greatly improve the accuracy of flower classification.		vision, edge detection.	
Shashidhar T Halakatti, Shambulinga T Halakatti. 2017/ International Journal of Computer Science (IIJCS)	1. This paper focuses on IRIS flower classification using Machine Learning with scikit tools. 2. The problem concerns the identification of IRIS flower species on the basis of flowers attribute measurements. 3. TheClassification of IRIS data set is discover among the patterns detection from examining petal and sepal size of the IRIS flower and describe it as how the prediction are generated for analyzing the pattern to from the class of IRIS flower. This use the semi-automated extraction of knowledge of data for identifying IRIS flower	1. This methodology use the Machine Learning for pattern recognition and computational learning algorithms that can learn from and make predictions on data by making data-driven predictions or decisions, through building a model from sample inputs. 2. This samples totally 150 datasets of Iris Flower are collected that belonging to three different species of Iris Flower that is Setosa, Versicolour and Virginca. 3. The Identification of Iris Flower species using machine learning using Python and the tool Scikit-Learn. 4. A K-Nearest Neighbor Algorithm to predict to find a predefined number of training samples closest in distance to the new point, and predict the label from the species of Iris Flower.	The resultant value of Iris flower recognition is carried out through k-NN having different parameter values. This K-NN parameter lies along with the neighbor's value of 1 and 5. When the k-NN value with parameter 1 is constructed then the accuracy reach to 67%. When the k-NN value with parameter 5 is constructed, its accuracy generated to be 62%. Thus, as the parameter value increases, the accuracy decreases. Better resultant rate received at the least	1. The prediction rate of Iris flower can be effective if the parameter value start from 0 in kNN neighbor value. 2. The dataset which build of 150 flower dataset is not clearly describes as whether a standard flower is consider or it captured from the camera. 3. Flower image prediction is not shown in the research paper. 4. The K-NN methodology comparison with other techniques of machine learning is not described. 5. More accurate and better machine learning algorithm can be implemented for

	species. 4. The supervised learning classification technique is evaluated for collecting the trained dataset for the response in categorical flower values that are in finite unordered set.	5. At the last the predict method returns an object of type number array with predicted response value. The model can predict the species for multiple observations at once.	value of k-NN parameters with the supervised learning.	flower prediction from flower images as well as cultivation land.
Shrikant Dharwadkar, Ganesh Bhat, Dr. N.V. Subba Reddy, Prakash K. Aithal. 2017/ 2nd IEEE International Conference On Recent Trends in Electronics Information &	1. The paper classify the floriculture through the neural network and deep learning for identification of flowers to aid in domains such as patent analysis of flowers and floriculture industry. 2. The Deep convolutional network using its pre-trained knowledge shows the potential for accurate identification of flowers than the present existing approaches for image classification. 3. The use of deep learning neural network classify the class through machine learning which uses unsupervised	1. This system use the simple neural network classification accuracy is compared with that of the deep neural network which builds up on the pre-learnt knowledge from Google's Inception v3 deep Neural Network model. 2. The image samples selected for the study consists of flower images of different varieties such as daisy, dandelion, roses, sunflowers and tulips. Data set are categorized into training and testing in a ratio of 60:40 consisting of around 800 images 3. The work is carried out using Tensor Flow Convolutional layer along with Transfer Learning on the Inception Neural Network thus the data must be pre-processed to be suitable to feed into the model.	1. The overall accuracy rate is gained with the percentage of 60% through the simple Neural Network and 70.36% retrieved through Transfer Learning. 2. But when they are combined with simple Neural Network and Transfer Learning, the result accuracy increased to 77%. 3. The different species recognition rate with overall are differ from each other as a. Daisy have 70.3%, b. Sunflower-18.90% c. Dandelion-99.39% d. Tulip – 70.08%	1. Comparison rate is shown but the accuracy rate measurement is not describes in the respective paper. 2. Dataset is carried out of very less flower. 3. Better comparison rate among flower is not mentioned with Simple Neural Network, Transfer Learning and combination of both. 4. More standard flower set may change the resultant and better transfer Learning methodology improves the recognition of flower.

Communication Technology (RTEICT),	learning approach for feature extraction on the input image for increases the accuracy of identify the flowers over the simple neural network. 4. Automatic flower classification is better than use the labor work. To reduce the workload due to manual this technique uses the classification, which is necessary to automate these tasks using modern machine learning.		e. Rose- 0.90% 4. Recognition rate varies a lot from different species of flower due to different shape, colour and no. of petal size. 5. Best result shown by the Dandelion and the worst rate shown in Rose flower species.	
Dor Oppenheim, Yael Edan, Guy Shani. 2017/ International Journal of Computer and Information Engineeri	This research presents an image analysis algorithm to detect and count yellow tomato flowers in a greenhouse with uneven illumination conditions, complex growth conditions and different flower sizes. The algorithm is designed to be employed on a drone that flies in greenhouses to accomplish several tasks such as pollination and yield estimation. The	1. This research technique are implemented on the MATLAB 2014b using its image processing and computer vision toolboxes. Flowers were tagged manually using MATLAB'S 2014b training image labeler. Its main procedure is based on three parts: a. First, lighting conditions are calculated and the RGB image is transformed to the HSV colour space. b. Secondly, the image is segmented into foreground and background using colour cues according to lighting conditions	1. The precision average for all the flower images acquires of 74% and 75% respectively. 2. 1069 images of greenhouse tomato flowers were acquired in a commercial greenhouse in Israel, using two different RGB Cameras – an LG G4 smartphone and a Canon PowerShot A590. 3. Results indicate better performance for the view angle	1. The accuracy of flower precision decrease if the image is capture in morning or night light. 2. Different angle of flower capturing unable the system to detect that from the image. 3. The overlapped or cut image flower in the image is not

ng	algorithm identifies flowers using an adaptive global threshold, segmentation over the HSV colour space, and morphological cues. The best result of flower precision occurs at afternoon light.	c. Thirdly, a simple classification is performed on the segmented foreground to calculate the flower according to size and location in the image. 2. The adaptive threshold divides the images into darker and lighter images. Then, segmentation on the hue, saturation and volume is performed accordingly, and classification is done according to size and location of the flowers. 3. The flower dataset were acquired from multiple angles and distances and were sampled manually at various periods along the day to obtain varying lighting conditions.	facing the flowers than any other angle. 4. Acquiring images in the afternoon resulted with the best precision and recall results. 5. Results showed no difference between the two cameras used. 6. Using hue values of 0.12-0.18 in the segmentation process provided the best results in precision. 7. Further analysis showed a 5% increase in precision and recall when analyzing images Acquired in the afternoon and from the front viewpoint.	perceived by the system. 4. The research use the traditional techniques to precise the yellow flower where it can improve using modern techniques. 5. For future , it can aimed to improve the detection algorithm using the large database created for this research by implementing machine learning algorithms and a local adaptive threshold for bettersegmentation and detection rate. 6. Future research will include images acquired from the drone pollinator for real

				conditions of pollination tasks
Aalaa Albadarnesh and Ashraf Ahmad. 2017/ International Journal of Computer Science and Network Jordan	There are various features which were extracted from the flower image, and the recognition algorithm that was used to recognize the flower species. The new automated system was adapted to detect the flower region from the image and recognize its species. Features based on colour, texture, and shape was extracted from the interest part only, so the recognition accuracy is increased. New Dataset has been built which contains flowers from Jordan. To gain the high recognition accuracy from the new dataset.	1. This research methodology worked on the photos for Jordanian flowers which were taken and used in building the Dataset. 2. This dataset contains flowers that grow in the Jordanian habitat such as Daisy and Papaver, Iris and Nigricans. 3. Pre-processing was applied to increase the segmentation 4. Lastly, the recognition task was decomposed into several binary classification tasks, based on Multiclass decomposition into binary class	1. An average of overall per class recognition rate is 82%. 2. Dataset was randomly splitted into 75% training data, and 25% testing data. 3. Better result occurs of the Jordan flowers. 4. Traditional recognition techniques are implemented for fine feature precision. 5. The accuracy rate is high for calculating purple and red flowers.	1. More flower can result better result clearification. 2. New Machine learning techniques used for the best result. 3. Flower dataset is not cleared about the capturing techniques, angle, resolution and colour of flower selected. 4. Only purple flower accuracy is built better as compare to white flower and yellow flowers. 5. Similar flower is not finally detected by the system.
S. Krishnaveni,A. Pethalakshmi. 2017/ Elsevier: The Korean Institute of	The proposed research use the algorithm that deals with the quality detection in various aspects specific to the Jasmine flower algorithm focuses on the colour, shape and texture features, combined to identify the flower quality. In the first phase of implementation, the colour features were	This research use the method is to determine the quality of a Jasmine flower by using different extracted features. Different varieties of Jasmine flowers were collected from various parts of Tamil Nadu including Madurai, Dindigul and Ramnad districts. It use Colour and edge directivity descriptor (CEDD) is a composite image descriptor	1. This paper shows the result with an accuracy of 83% which has been obtained in flower identification. 2. The performance evaluation of sensitivity, specificity and precision for colour, texture features and colour, texture and shape features is finely acquire.	1. The database consists of 500 types of features, i.e., 350 good quality features and 150 defected features so that the training can be conducted efficiently, but the collection of dataset is not describe in the paper. 2. The shaper of flower (full

Communications Information Sciences, Science Direct	extracted using the average colour difference and colour and edge directivity descriptor method. In the second phase of the implementation, the shape and texture features were extracted using Zernike moments and local binary patterns. The third phase involved the classification by using a support vector machine and random forest tree classifiers to have the better detection rate.	that captures and relates shapes, textures, and colours from an image, HSV colour space to recognize various colour space models and lastly Local binary patterns (LBP) is used to extract the texture feature.	3. The diseases in leaves have been detected by its shape, and which shows the accuracy of 84.69%.	bloomed or bud) is considering in the paper is not clearly describe. 3. Jasmin flower is very famously and mostly cultivated, so better technique will acquire the better result in quality detection.

3.4 A Summary of Reviewed Literature

Takeshi Saitoh. *et.al.*(2004).Proposed an automatic algorithm for flower recognition; the experiment uses 600 pictures and ultimately handled a 90% recognition rate. Maria-Elena Nilsback.*et.al.* (2006)from the University of Oxford was studying the method of flower recognition from 2006 to 2010. The better proposed worked are carried out from a visual vocabulary for flowerrecognition in 2006 and developed an automatic segmentation algorithm for flowers in Andrew Zisserman.*et.al* (2007). Tzu-Hsiang Hsu.*et.al* (2010); improved the segmentation algorithm once more Han Ching Voon.*et.al* (2012). Madirakshi Das *et.al*(2011) worked on Indexing of flower patent image with specialized dataset using spatial domain knowledge iterative segmentation algorithm. Serge Belongie.*et.al* (2002), Mojsilovic.*et.al* (2005) for precise object precision although numerous algorithms were used for flowers recognition, it's quite difficult to analyze because of the high inter-class similarities and intra-class variation. We can see from above that during this time, people put more energy to preprocess of the flower image and the feature selection to

classify. X. Ren.et.al (2003) described the precision segmentation for the partition of region with its colour and feature for various flowers, this result to have change into many result. Various colour models applied over the foreground and background containing a huge variation that build a robust property in the image including illumination effect. Chang-Hsing Lee (2011) proposed an work on the flower image recognition system based on an flower recognition system that draw an appropriate flower image boundary window which contains the nearest region.

4. Motivation/Justification and Relevance

India is a cultivated land. Rose, marigold, sunflower, lily are some of the most cultivated flowers in India. More than 1.60 lakh is annually gained by the farmers through flower cultivation from floriculture. Processing is an effective technique for the yielding of flower in a large area for cultivation and gives a precision of how much total number of flowers has been cultivated in whole land through digital image. The flower yielding has become an ease of way for prediction precision of Floriculture of Flower Land. It will help lot of farmers to gain the knowledge of their flower bloomed in the land and easily estimate their cost as well as income. Thus, we want to recognize the well-bloomed flowers from the cultivated land to achieve maximum cost benefits from segmentation along with machine learning. Nowadays, as smartphone are readily available and handy, image searching is becoming more common with people. It is commonly been used in case of flower identification. As we all know, Internet can be used to search anything whether it is text or Image. This interest of searching things motivates us to enhance the technology. There are thousands of species of flower which is not possible for a person to know or remember. Once you know the name you can find more information about a flower on the web. Thus we want to classify the species of flower using the current technology of machine learning. Thus combining both the problem of species identification and detection of well-bloomed flower from the cultivated land through capturing the image is need to build in out further research work. Various species recognition andrecognition are done over the dataset given by the University of Oxford as FLOWER17 and Flower102 using different technology of segmentation, machine learning, neural network, deep learning etc. But none of the studies have recognized the species from capturing image as well as dataset both. It needed to obtain the better result than the earlier using machine learning techniques. But the Flower recognition is a very challenging problem, because there are thousands of flower species in the world. The previous work about flower recognition primarily relies on features, such as colour, texture or shape. Qinghua Y.*et.al* (2017) combines the local and global hypotheses in the machine learning network for multi-labeling image classification that improves the recognition performance. Prashengit Dhar *et.al* (2019) purposed a Support Vector Machine algorithm over the digital

flower image through Speed up Robust Features for flower extractions. Musa Cıbuk.*et.al* (2019) has used the Support vector algorithm over the deep Convolution network for flower recognition.

Bhanuprakash.*et.al*. (2016) worked on Flower Species recognition Using Neural Network with different species of flower with the help of visual content of flower image instead of Flower Name. They analyzed on the extraction of flower textural Features by neural network techniques. **Halakatti1.*et.al*. (2018)** used the methodology of machine learning for identification Of Iris Flower Species for having the Purple shaded flowers with the tool called Scikit Tool. Their algorithm is implemented over the supervised learning dataset over the multiple levels of abstraction. This is highly important over the automatic detection feature that plays the most important role in data collection. Various other methods like Colour and edge directivity descriptor (CEDD), Local binary patterns (LBP), Logistic Regression (LR), VGG 16 or 19 deep learning architecture, Inception-v3, Regions of Interest (ROI), Histogram of Gradient (HOG), support vector machine (SVM), Fuzzy C-Means clustering algorithm (FRFCM) method, Scale-invariant feature transform (SIFT) features Model are applied on all these flower recognition.

All this has motivated to explore the machine learning techniques over the regional area of flower dataset recognition.

5. Objectives

- To study the existing literature related to flower recognition and classification system.
- To review classification system methodology and their earlier implementation from research papers.
- To write review findings and establish the research problem to achieve the research target(s).
- To review existing data sets for Flower species and identify essential features used for recognition of flower species. Also identify features or parameters for optimization.
- To design Flower Species Recognition system using optimised machine learning algorithm
- To compare and evaluate the algorithm with respect to other approaches.
- To justify and validate the algorithm on a group of data sets.

6. Hypotheses

Hypothesis 1:

Machine Learning techniques will work more efficiently with less manual intervention.

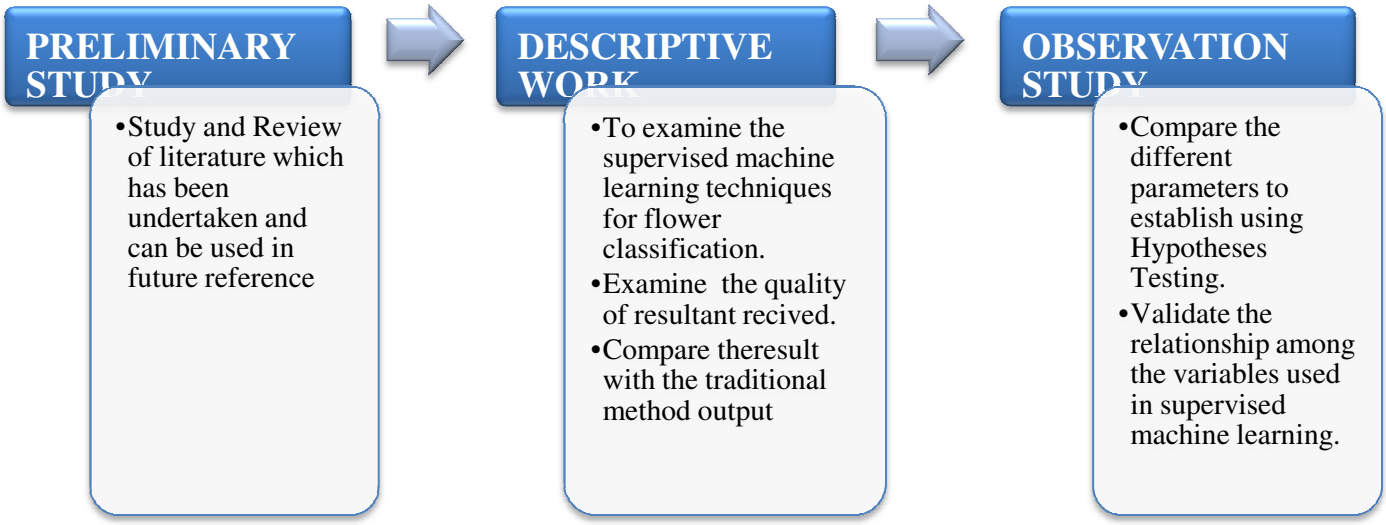
Hypothesis 2:

The output will be better than the traditional methodology.

7. Plan of Work and Methodology

7.1 Research Design

The work will be accomplish for flowers species like Rose, Jasmine, Lily and marigold that were highly flourish in the cultivated land and collected for utilizing for various fields and from the standard dataset accessible. The recognition of flower species will be accomplished with supervised labeling image so that it will be easier to classify the flower from various regions among different species of flowers. The different objective is proposed through the following Research Design.


PRELIMINARY STUDY
•Study and Review of literature which has been undertaken and can be used in future reference
DESCRIPTIVE WORK
•To examine the supervised machine learning techniques for flower classification.
•Examine the quality of resultant recived.
•Compare theresult with the traditional method output
OBSERVATION STUDY
•Compare the different parameters to establish using Hypotheses Testing.
•Validate the relationship among the variables used in supervised machine learning.

7.2 Data Collection

The flower dataset need to be collected from online sites or by self-capturing by digital camera or by Smartphone

.

7.3 Tools and Techniques

In order to fulfill the objectives of the proposed Study, a few toolswhich are used so far are listed below:

Python programming language,TensorFlowlibrary,

Anaconda framework for machine learning

8. Limitation

It is too early to enumerate the limitations of the proposed study.

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